An SOS for the OEMs

Kiran Kothekar

Every large auto OEM Company contributes significantly to the country's economy. Not only does it contribute through its own business but also through a large cluster of Tier I and Tier II suppliers, which are set up to supply parts to the OEM company. With a innumerable parts going into one automobile, the number of vendors involved is huge. The volumes done by the vendors are tightly linked to the volumes produced by the OEM. No other industry is so tightly coupled. With such an industry structure, the actions of the OEM have cascading effects in the entire supply chain. To understand more, let us go through the two case studies.

Case Study 1

In Oct 2009, I met the owner of a Tier II supplier to the auto industry. He was at his wit's end in managing supplies to the OEM customer and was under considerable stress. By this time, for the OEMs, the so called recession was over, and OEM's production figures had improved considerably. Though the OEM's production figures had increased, the supplier's business financials were in a mess. His cash was completely drained out and his borrowings had increased significantly as he was not making enough money for pay off his fixed expenses and earlier purchases. His interest burden had increased significantly. He was struggling to get the skilled manpower to manage the increase in load from his customer – the Tier I supplier. He was struggling to even produce quantities which he could manage easily before the recession. He was struggling to get manpower and at same time, due to his cash position, he was hand to mouth in raw material.

The situation was further compounded by the changing schedules from his customer. If the schedule changed he had to buy the new requirement of raw material, while his already scarce cash was locked in something he had bought three days back. His deliveries to his customer (Tier I supplier) were suffering in terms of quantity and reliability. As is the normal tactic, in such situations, each supply chain partner threatened the other with business diversions if they did not fall in line. In the short run, business transition is difficult, so the supplier's problems cascaded the entire supply chain and the OEM production schedules got seriously affected despite the demand.

Case Study 2

Let us take another case in "normal" circumstances. One OEM had to meet the year end stretch target, so it started a promotion campaign to push a particular model. The OEM decided to produce this specific model at three-four times higher rate than the normal rate. The plan was made for Jan to March 2011 with very short notice. They did produce the quantity in January to March, and achieved very good numbers for the year. After March the rate dropped to less than 40 percent of the rate of January to March, as a substantial quantity of these vehicles produced in January to March are either in FG of the OEM or in the FG of the distributors.

Higher numbers means great figures for all suppliers as well. Right? Not so for some! One of the parts required an imported raw material, which the supplier had planned according to normal rate. The lead time to get the material under normal circumstances by ship is about 60-70 days. As they were single source, they had no choice but to airfreight this material to make it available for higher quantities from January itself. Unfortunately the airfreight charges for this material are more than 15 percent of the cost of this material, and this material was nearly 50 percent of the material cost of the final product. Also they had to arrange for additional borrowings for the huge increase in this material's requirement as the terms for this material was on payment on landing in the country. The supplier also had to ramp up its production capacity to cater to this huge rate which required investment in certain fixed assets. With firefighting, increased expenses and additional investments they did meet the OEM's requirement. Could they make the planned profit for this product? Don't require much imagination to calculate that. Compound this with fact that this supplier also ordered material to arrive by ship to cater to the higher rate for April-June as well. As the volumes have decreased considerably, this inventory went upto nearly 120 days of requirement. Fortunately the product is not the highest volume product for this supplier, hence it could still manage the burden.

What about the others who do not have this advantage? They can become weak due to increased expenses and considerably increased working capital. This does affect their delivery performance to the OEM, which in turn affect the plans of the OEMs and then the vicious cycle of continuously changing plans start affecting other suppliers and OEMs.

The two case studies are not isolated. Industry players will agree to this and can narrate many other stories.

> During the time of growing demand, organisations have a way to stay in equilibrium and make some money despite the severe issues of flow in the entire supply chain. But the chain can inflict devastation on itself when the end demand starts moving downwards

Is this not what Lean was supposed to solve? One of the management philosophies which have inspired almost all auto companies is the Toyota Production System or the concepts of lean management. One of the fundamental philosophies of lean is the concept of flow —the inventory in the entire supply chain should flow at a rate dictated by the pace of the market demand. Many auto companies swear by the concepts of lean thinking but the above case studies point to lack of flow in the entire chain. Is it a case of 'lip service' to lean or is it that most auto companies are actually not in a position to implement the flow concepts of Lean beyond their production shopfloor? For answers, let us understand the OEM way of working.

The OEM Way

Most OEMs provide monthly requirements of components which are derived from their sales forecast of vehicles but prefer to pick the components on a daily basis based on actual consumption. They limit their component inventory to maximum of a day or two and their offtake is aligned to actual consumption – a perfect pull system. But at the same time, they expect the suppliers to operate on a push mode – the monthly or weekly forecasting system.

As with every forecasting, the actual vehicle production is different and as a result, the vendor production system is in a frequent mode of expediting. Not expediting every time helps, which means some vendor misses out on the immediate requirement of component. The problem aggravates as OEM is an assembly plant. Even a single missing part prevents the production of the vehicle. But at the same time the OEMs want their capacity to be utilised fully. With many items in various states of availability, they have no option but to load the lines with anticipated arrivals, resulting in some vehicles being loaded much more than the daily rate conveyed to the suppliers. A small variation in forecasting in one model can result in surge of production in some other SKUs.

If the suppliers do not supply according to the daily changed plan and cause line stoppages with the OEM, they get penalised. Frequent failures to supply carry a huge business risk for the supplier—they may lose business permanently. So suppliers try to overcome the problem with their own buffering—build finished goods inventory to cater to any increases. They do their own forecasting on what will sell and try to maintain high inventory of parts / subassemblies from Tier II suppliers. The same logic applies to Tier II suppliers, but they have to keep even higher level of inventory as the Tier I is producing in batches, which means that if the OEM is carrying two-three days of parts, the Tier I will carry 15-30 days of FG and 15-30 days off parts inventory. The Tier II carries about a month of FG+ WIP (due to high batches of production) and about 30-45 days of RM.

The problem is despite all the inventory, the supply chain is in continuos state of expediting due to poor availability at an SKU level. This is a normal state of affairs for managing an auto supply chain. Frequent schedule changes and expediting is the way of life. During the time of growing demand, organisations have a way to stay in equilibrium and make some money despite the severe issues of flow in the entire supply chain. But the same supply chain can inflict devastation on itself when the end demand starts moving downwards.

Blaming Recession

Let us analyse the events in the middle of 2008. OEMs were getting the signals that market was slowing. The finished goods inventory was pilling up and distributors are filled up to the brim. Under the pressure to utilize capacity the OEMs kept on producing to full capacity, obviously based on a forecast, for about two months. When finally it was no longer possible to push further, the OEMs took the decision to cut down their production, nearly three months of FG was available in the sales pipeline.

The same effect was seen with the Tier I suppliers, they continued to produce full blast even after the OEMs started to reduce their production. Same effect was seen in the Tier II suppliers, which lead to their inventory ballooning up. With the lower sales rate, the FG inventory at TierI and Tier II suppliers was nearly 45-60 days and so was their RM. In the period that the OEMs were asking for much lower volumes (their factories were operating, at lower production rates), the suppliers were supplying from FG. They could foresee their workforce idling for about two-three months, while the net inflow in the company reduced significantly. They had no option but to trim down the workforce considerably. The TierI slowed down for additional three months, and the Tier II for an additional 6 months.

When the time came to ramp up, the workforce and capital was not available and these suppliers took time to gather workforce and capital. The last to react and last to ramp up was the Tier II/III supplier. By the ninth month the inventory in the pipeline dried up. Meanwhile the reduced output did not bring in enough gross contribution to pay all the fixed expenses. The other fixed cost head that gets compromised in such situations is the interest on working capital. So when the OEM wanted to ramp up, the suppliers was not ready, that took another four-six months.

The OEMs are better equipped to survive the slowdown for a shorter period of six-nine months. Are the Tier II equipped to float for 12 months or more at less than half the capacity utilisation? They are not, and hence you hear horror stories. Also those who survived are not ready to further the risk by increasing investments. If they increase investments ie fixed costs, the period for which they can survive such a slowdown decreases.

So we have a key question before us "Was the impact of recession so bad?" or the OEM way of operations worsened the situation and caused the real damage.

What Do We Learn?

When demand started falling decisively, the level of corrections imposed on the supply chain partners farther away from the consumption point was very severe. This effect is known as the bull-whip effect and this time the whip almost wiped out few players.

The reason for such devastation is the lag in reaction to the change in market demand. The higher the lag in response, bigger is the damage. The lag in response is triggered because of a push mode of operations between the distributors and the OEMs which cascades into push mode between suppliers and OEM production. The monthly forecasting system, along with pressure on department managers to meet their monthly or quarterly performance targets increases the lag in reaction time in such supply chain.

So what we need is a supply chain inherently reacting to the consumption or in other words we have an operation in the entire supply chain which is similar to the offtake of components from the supplier's warehouse – supply and produce only according to actual consumption.

So instead of limiting the principles of pull limited to off take of components, we have to extend the same principles in the entire supply chain right from distributors to Tier II suppliers.

But is this not what Kanban supposed to do? Why it is not implemented in the entire automobile supply chain. There is not a single case study in India of principles of Kanban implemented right from distributors to Tier II component suppliers. This is despite the fact that principles of TPS are well documented and known to the industry for decades.

Theory of Constraints (TOC) Approach

Eli Goldratt in his path breaking article 'Standing on the Shoulder of Giants' clearly proved why it almost impossible to implement Kanban in an environment of changing product mix and varying demand loads across time buckets, rapid new product introduction at component levels, unless one is able to impose smoothening of demand on to its customers, the way Toyota has done. Not many auto OEMs are in a position to implement such smoothening. So they implement only parts of lean management which is easier to implement (like principles of SMED,5S, standardisation etc).

▪ Contd. on Page 40

Contd. from Page 38

The TOC flow solution framework for the entire supply chain from dealers to Tier II suppliers

The extent of variation in demand of the vehicles across weeks at the secondary sales level is not as high as the eventual variation imposed on the supply chain. But it does exist, and is not entirely uniform across weeks. A mechanism that buffers the supply chain partners even from this variation will reduce the emergencies and chaos to a great extent. Such a solution should reduce the level of variability in and prevent misuse of capacity (producing what is not required immediately) and locking of working capital.

OEMs should hold a Finished Goods (FG) Inventory buffer, designed at an SKU level. This is different from the default FG carried by OEMs. The central warehouse is the place to hold the designed buffers as it is the aggregation point, for all FG inventory. The forecasting accuracy is better at the aggregation point than at the dealer level. But to always maintain the designed buffers, it should not push the inventory to the dealer to meet targets of primary sales. They should supply only to real demand and not supply for inventory. Supply has to be as per consumption or pull from the secondary sales or a direct end customer order. For some SKUs where tolerance time for customer to wait is lower than transportation time from central warehouse to dealer, the dealer can keep a buffer, of regularly sold SKUs, to cover paranoid sales in the replenishment time from the OEM FG warehouse. For other infrequently ordered SKUS can be ordered from the OEM FG warehouse, as for such items the customer's do have adequate tolerance time. The dealers communicate their daily buffer status and OEMS dispatch to fill these buffers as they get truckloads (Order daily, Replenish Frequently).

The buffer depletion of the central warehouses provides the order quantities to the plants which the plant can club over SKUs to get the best out of their plants. So the plant does operate on sales and production forecast – they operate their production based on consumption signals from central warehouse. The priority can be simple signal of the risk to stock-out which in the TOC solution is called buffers management (the stock is divided into three equal zones, with the 0-33percent stock level being red, the other being yellow and the green zones). The 'red' SKUs always gets the first priority.

The plants should not produce more than the quantities suggested by the buffers. This prevents the bullwhip effect to the suppliers. The negative is that some production lines may not be used from time to time when correction is required. The periods of small corrections is far better than taking a huge correction of operating at half the load or shutting it off for long period of weeks/ months when the inventory piles beyond the working capital capacity of the OEM.

The above steps will help in smoothening of production to large extent. Further smoothening can be done for the Tier I suppliers, who can also maintain similar designed buffers decided by consumption by OEM rate per day x their production lead time x a factor of safety. The OEM relays its daily requirement to the first tier and it supplies from its buffer. Thus the OEM can get varying quantities across components. The depletion of all SKUs is relayed to the plant everyday. Based on the buffer penetration and colour priority the Tier one takes up its production. Thus it is decoupled from the daily fluctuations of the OEMs and can plan its batches.

> The TOC system is built on the flow principles of Toyota Production System. It is a paradigm shift in managing distributers & suppliers. The starting point is the flow of inventory between distributors and OEMs

The buffer can be reduced by reducing the production lead time, the Tier one maintains a buffer of its components and raw material, again in buffers with the three colours. These buffer status (stock level and colour) are relayed to the Tier II who supply from their FG buffers to fill these buffers.

What happens when secondary sales rate changes? There exists a mechanism in TOC called the Dynamic Buffer Management which adjust the buffers of SKUs as the sales/ consumption rate or the lead times change. If the SKU is in red continuously for the replenishment time, the buffer is increased by 33 percent and if green for more than two replenishment times it is reduced by 33 percent.

With this system any variation in the OEMs sales is relayed within days to the Tier II and III suppliers. The OEMs can plan as per the market requirement and get out of the vicious loop of unwanted inventory of vehicles piling up in its warehouses at the dealers and affecting the sales as credit limit of distributor dries up due to non moving stocks. The plants of the Tier I and Tier II suppliers are decoupled from the fluctuations of the OEM by the buffers, allowing getting the maximum out of their plants. The system also prevents inventory buildup against a forecast, which could go wrong, thus assisting in effective working capital.

TOC: An Alternative?

The TOC system is built on the flow principles of Toyota Production System. However it scores over the Kanban system as there is no need to force the smoothening of production to the final customers. The TOC concepts of aggregation at central warehouse and supply only as per consumption prevent the artificial spikes, the actual demand variation in secondary sales is managed using the dynamic buffer management instead of a forced smoothening to the end consumer.

The implementation of flow principles is a paradigm shift in managing distributers and suppliers. The starting point is the flow of inventory between distributors and OEMs. Hence this can only be lead by the OEMs. If an OEM implements the principles of flow, it not only helps itself but also protects a cluster of companies from the damaging bull-whip effect.

(The author is the Founding Director of Vector Consulting Group. Please send in your comments to kiran@vectorconsulting.in. Vector Consulting Group (www.VectorConsulting.in) is the leader of 'Theory of Constraints' consulting in India. Vector has been working closely with some of the well known retail chains, FMCG, fashion products and auto companies to improve their overall profitability through supply chain effectiveness.Views expressed are personal.)